

NOTE

A Putative Pheromone-gland Associated Modification of the Hind Tibia in *Vipio moneilemae* (Hymenoptera: Braconidae: Braconinae)

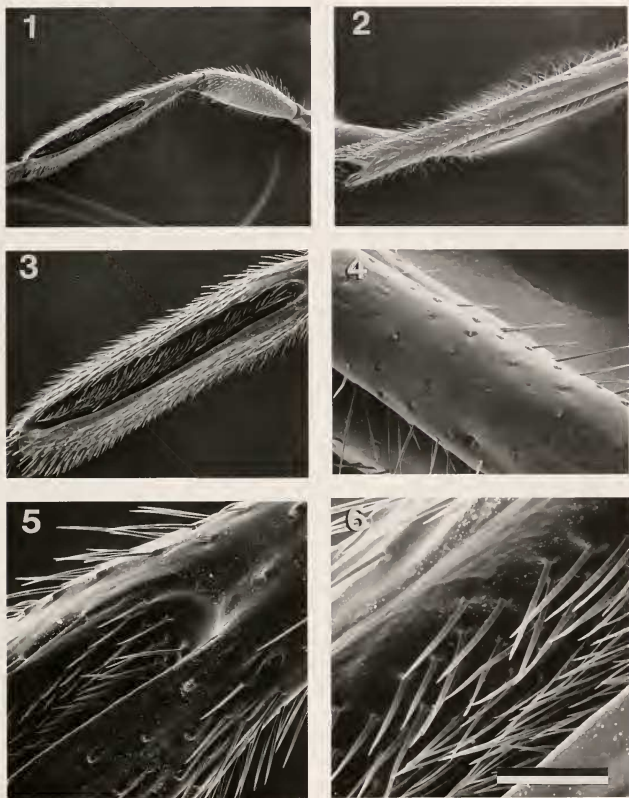
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More is known about the pheromone and other exocrine glands of braconid wasps than any other group of parasitic Hymenoptera, although behavioural evidence suggests that they are present in many if not all groups and that their products collectively have a variety of roles including mate location, host marking, defence and spacing (Quicke, 1997). The majority of pheromone glands identified to date are located in the metasoma (Weseloh 1980; Tagawa 1983; Buckingham and Sharkey 1988; Quicke 1991; Field and Keller 1994; Quicke *et al.* 1996, 1997) although recent studies have indicated that the antennae also have a wide range of intrinsic glands that are involved in courtship as well as host assessment (Bin *et al.* 1986, 1989; Isidoro and Bin 1995; Isidoro *et al.* 1996). Here we describe and illustrate a modification of the hind tibia of a braconine wasp, *Vipio moneilemae* Gahan, that was noticed during revision of the North American species of *Vipio* (Inayatullah *et al.* 1998). The morphology of the structure suggests that it is yet another exocrine gland, and its presence only in males further suggests that, if the newly described structure is associated with a gland, then this may be a release site for sex pheromones. It is worth noting that the hind tibia of an unrelated braconid, the chelonine *Ascogaster reticulatus* Watanabe, has been

identified as the source of a sex pheromone, but in this case the glands are present only in females (Kainoh and Oishi 1993). Males of this species apparently follow female pheromone trails as do the males of the aphelinid *Aphelinus asychis* Walker (Fauvergue *et al.* 1995).

The male hind tibia of *V. moneilemae* is especially thickened for most of its length (Figs. 1, 3) whereas that of the female (Fig. 2, 4) is essentially unmodified. Along almost the whole of the dorsal surface of the male hind tibia, there is a deep groove bordered laterally by a distinct ridge on both the inner and outer sides. Within this groove, there is a dense arrangement of setae that point somewhat posteriorly and whose tips converge towards the mid-line of the groove (Figs. 5, 6). In some uncleaned specimens, the setae are covered by a deposit, perhaps the dried secretion of an associated gland, though this has not been confirmed. We were not able to see any cuticular pores but these may be small and the setae obscured the view of most of the floor of the groove. The arrangement and close-spacing of the setae in the tibial groove suggest that they could act as a wick and provide an increased evaporative area for the release of pheromones; similar evaporative setal structures have been found associated with the metasomal glands of agathidine braconids (Bucking-



Figs. 1-6. Features of the hind leg of *Vipio monilemae*. 1, 3, 5, 6, male leg showing swollen tibia with dorsal groove and associated setal arrangement; 2, 4, female showing unmodified tibia. Scale bar: 1 = 860 μm ; 2, 3 = 380 μm ; 4 = 136 μm ; 5 = 100 μm ; 6 = 50 μm .

ham and Sharkey 1988). No similar structures have been found on the legs of any other species of *Vipio*, nor on those of other braconines.

Vipio species are idiobiont larval ectoparasitoids of concealed hosts living in wood. Unfortunately, very little is known about *V. moneilemae* apart from the fact that it has been reared from a species of *Moneilema* (Cerambycidae) in Mexico (Gahan 1930), and it is known from only a handful of specimens from Mexico and the southern USA (California, Texas, Utah: most of the known specimens are in the United States National Museum of Natural History). The majority of parasitic wasps are protandrous, and the males of many that attack wood-boring hosts congregate at sites from which females are about to emerge, and where a variety of competitive tactics may ensue. If the structure seen on the hind tibia of male *V. moneilemae* is indeed associated with a sex pheromone gland, it may suggest a radically different mating strategy.

Large putative sex pheromone glands are found in the metasomata of males of many genera of braconines (Quicke 1991) as well as in a range of other braconids such as many opiines, alysiines and agathidines (Buckingham and Sharkey 1988). Most work, including the chemical analysis of glandular products, has been carried out on those of some Opiinae (Williams *et al.* 1988) and it has been proposed that these have a role in courtship although a defensive role cannot be excluded. Without doubt, more work needs to be done on the roles of male exocrine glands in the Braconidae and other parasitic wasps.

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